CHAIRMAN'S MARK
APRIL 25, 2003

TITLE IX — RESEARCH AND DEVELOPMENT

SEC. 901. SHORT TITLE.

This Title may be cited as the "Energy Research, Development, Demonstration, and Commercial Application Act of 2003".

SEC. 902. GOALS.

(a) IN GENERAL.—In order to achieve the purposes of this title, the Secretary shall conduct a balanced set of programs of energy research, development, demonstration, and commercial application, focused on—

(1) increasing the efficiency of all energy intensive sectors through conservation and improved technologies,

(2) promoting diversity of energy supply,

(3) decreasing the nation's dependence on foreign energy supplies,

(4) improving United States energy security, and

(4) decreasing the environmental impact of energy-related activities.

(b) GOALS.—The Secretary shall publish measurable cost and performance-based goals with each annual budget submission in at least the following areas:

(1) energy efficiency for buildings, energy-consuming industries, and vehicles;

(2) electric energy generation (including distributed generation), transmission, and storage;

(3) renewable energy technologies including wind power, photovoltaics, solar thermal systems, geothermal energy, hydrogen-fueled systems, biomass-based systems, biofuels, and hydropower;

(4) fossil energy including power generation, onshore and offshore oil and gas resource recovery, and transportation; and

(5) nuclear energy including programs for existing and advanced reactors, and education of future specialists.

(c) PUBLIC COMMENT.—The Secretary shall provide mechanisms for input on the

annually published goals from industry, university, and other public sources.

(d) EFFECT OF GOALS.—Nothing in subsection (a) or the annually published goals creates any new authority for any Federal agency, or may be used by a Federal agency to support the establishment of regulatory standards or regulatory requirements.

SEC. 903. DEFINITIONS.

For purposes of this title:

(1) The term "Department" means the Department of Energy.

(2) The term "departmental mission" means any of the functions vested in the Secretary of Energy by the Department of Energy Organization Act (42 U.S.C. 7101 et seq.) or other law.

(3) The term "institution of higher education" has the meaning given that term in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)).

(4) The term "National Laboratory" means any of the following laboratories owned by the Department:

(A) Ames Laboratory.

(B) Argonne National Laboratory.

(C) Brookhaven National Laboratory.

(D) Fermi National Accelerator Laboratory.

(E) Idaho National Engineering and Environmental Laboratory.

(F) Lawrence Berkeley National Laboratory.

(G) Lawrence Livermore National Laboratory.

(H) Los Alamos National Laboratory.

(I) National Energy Technology Laboratory.

(J) National Renewable Energy Laboratory.

(K) Oak Ridge National Laboratory.

(L) Pacific Northwest National Laboratory.

(M) Princeton Plasma Physics Laboratory.

(N) Sandia National Laboratories.

(O) Stanford Linear Accelerator Center.

(P) Thomas Jefferson National Accelerator Facility.

(5) The term "nonmilitary energy laboratory" means the laboratories listed in (4) with the exclusion of (4)(G), (4)(H), and (4)(N).

(6) The term "Secretary" means the Secretary of Energy.

(7) The term "single-purpose research facility" means any of the primarily single-purpose entities owned by the Department or any other organization of the Department designated by the Secretary.

Subtitle A—Energy Efficiency

SEC. 911. ENERGY EFFICIENCY.

(a) IN GENERAL.—The following sums are authorized to be appropriated to the Secretary for energy efficiency and conservation research, development, demonstration, and commercial application activities, including activities authorized under this subtitle:

(1) for fiscal year 2004, $616,000,000;

(2) for fiscal year 2005, $695,000,000;

(3) for fiscal year 2006, $772,000,000;

(4) for fiscal year 2007, $865,000,000; and

(5) for fiscal year 2008, $920,000,000.

(b) ALLOCATIONS.—From amounts authorized under subsection (a), the following sums are authorized:

(1) For activities under section 912—

(A) for fiscal year 2004, $20,000,000; and

(B) for fiscal year 2005, $30,000,000.

(2) For activities under section 914—

(A) for fiscal year 2004, $4,000,000; and

(B) for each of fiscal years 2005 through 2008, $7,000,000.

(3) For activities under section 915—

(A) for fiscal year 2004, $20,000,000;

(B) for fiscal year 2005, $25,000,000;

(C) for fiscal year 2006, $30,000,000;

(D) for fiscal year 2007, $35,000,000; and

(E) for fiscal year 2008, $40,000,000.

(c) EXTENDED AUTHORIZATION.—There are authorized to be appropriated to the Secretary for activities under section 912, $50,000,000 for each of fiscal years 2006 through 2013.

(d) None of the funds authorized to be appropriated under this section may be used for—

(1) the promulgation and implementation of energy efficiency regulations;

(2) the Weatherization Assistance Program under part A of title IV of the Energy Conservation and Production Act;

(3) the State Energy Program under part D of title III of the Energy Policy and Conservation Act; or

(4) the Federal Energy Management Program under part 3 of title V of the National Energy Conservation Policy Act.

SEC. 912. NEXT GENERATION LIGHTING INITIATIVE.

(a) IN GENERAL.—The Secretary shall carry out a Next Generation Lighting Initiative in accordance with this section to support research, development, demonstration, and commercial application activities related to advanced solid-state lighting technologies based on white light emitting diodes.

(b) OBJECTIVES.—The objectives of the initiative shall be to develop advanced solid-state organic and inorganic lighting technologies based on white light emitting diodes that, compared to incandescent and fluorescent lighting technologies, are longer lasting; more energy-efficient; cost-competitive and have less environmental impact.

(c) INDUSTRY ALLIANCE.—The Secretary shall, within 3 months from the date of enactment of this section, competitively select an Industry Alliance to represent participants who are private, for-profit firms which, as a group, are broadly representative of United States solid state lighting research, development, infrastructure, and manufacturing expertise as a whole.

(d) RESEARCH.—

(1) The Secretary shall carry out the research activities of the Next Generation Lighting Initiative through competitively awarded grants to researchers at Industry Alliance participants, national laboratories and institutions of higher education.

(2) The Secretary shall annually solicit from the Industry Alliance—

(A) comments to identify solid-state lighting technology needs;

(B) assessment of the progress of the Initiative's research activities; and

(C) assistance in annually updating solid-state lighting technology roadmaps.

(3) The information and roadmaps under (2) shall be available to the public.

(e) DEVELOPMENT, DEMONSTRATION, AND COMMERCIAL APPLICATION.—The Secretary shall carry out a development, demonstration, and commercial application program for the Next Generation Lighting Initiative through competitively selected awards. The Secretary may give preference to participants of the Industry Alliance selected pursuant to subsection (c).

(f) COST SHARING.—The Secretary shall require cost sharing according to 42 U.S.C. 13542 (2002).

(g) INTELLECTUAL PROPERTY.—The Secretary may require, in accordance with the authorities provided in 35 U.S.C. 202(a)(ii), 42 U.S.C. 2182 and 42 U.S.C. 5908, that for any new invention from subsection (d)—

(1) that the Industry Alliance members who are active participants in research, development and demonstration activities related to the advanced solid-state lighting technologies that are the subject of this legislation shall be granted first option to negotiate with the invention owner, at least in the field of solid-state lighting, non-exclusive licenses and royalties on terms that are reasonable under the circumstances;

(2) that the invention owner must offer to negotiate licenses with the Industry Alliance participants cited in (1), in good faith, for at least 1 year after U.S. patents are issued on any such new invention; and

(3) such other terms as the Secretary determines are required to promote accelerated commercialization of inventions made under the Initiative.

(h) NATIONAL ACADEMY REVIEW.—The Secretary shall enter into an arrangement with the National Academy of Sciences to conduct periodic reviews of the Next Generation Lighting Initiative.

(i) DEFINITIONS.—As used in this section:

(1) The term "advanced solid-state lighting" means a semiconducting device package and delivery system that produces white light using externally applied voltage.

(2) The term "research" includes basic research on the technologies, materials and

manufacturing processes required for white light emitting diodes.

(3) The term "Industry Alliance" means an entity selected by the Secretary under subsection (c).

(4) The term "white light emitting diode" means a semiconducting package, utilizing either organic or inorganic materials, that produces white light using externally applied voltage.

SEC. 913. NATIONAL BUILDING PERFORMANCE INITIATIVE.

(a) INTERAGENCY GROUP.—Not later than 90 days after the date of enactment of this Act, the Director of the Office of Science and Technology Policy shall establish an interagency group to develop, in coordination with the advisory committee established under subsection (e), a National Building Performance Initiative (in this section referred to as the "Initiative"). The interagency group shall be co-chaired by appropriate officials of the Department and the Department of Commerce, who shall jointly arrange for the provision of necessary administrative support to the group.

(b) INTEGRATION OF EFFORTS.—The Initiative shall integrate Federal, State, and voluntary private sector efforts to reduce the costs of construction, operation, maintenance, and renovation of commercial, industrial, institutional, and residential buildings.

(c) PLAN.—Not later than 1 year after the date of enactment of this Act, the interagency group shall submit to Congress a plan for carrying out the appropriate Federal role in the Initiative. The plan shall include—

(1) research, development, demonstration, and commercial application of systems and materials for new construction and retrofit relating to the building envelope and building system components; and

(2) the collection, analysis, and dissemination of research results and other pertinent information on enhancing building performance to industry, government entities, and the public.

(d) DEPARTMENT OF ENERGY ROLE.—Within the Federal portion of the Initiative, the Department shall be the lead agency for all aspects of building performance related to use and conservation of energy.

(e) ADVISORY COMMITTEE.—The Director of the Office of Science and Technology

Policy shall establish an advisory committee to—

(1) analyze and provide recommendations on potential private sector roles and participation in the Initiative; and

(2) review and provide recommendations on the plan described in subsection (c).

(f) CONSTRUCTION.—Nothing in this section provides any Federal agency with new authority to regulate building performance.

SEC. 914. SECONDARY ELECTRIC VEHICLE BATTERY USE PROGRAM.

(a) DEFINITIONS.—For purposes of this section:

(1) The term "battery" means an energy storage device that previously has been used to provide motive power in a vehicle powered in whole or in part by electricity.

(2) The term "associated equipment" means equipment located where the batteries will be used that is necessary to enable the use of the energy stored in the batteries.

(b) PROGRAM.—The Secretary shall establish and conduct a research, development, demonstration, and commercial application program for the secondary use of batteries. Such program shall be—

(1) designed to demonstrate the use of batteries in secondary applications, including utility and commercial power storage and power quality;

(2) structured to evaluate the performance, including useful service life and costs, of such batteries in field operations, and the necessary supporting infrastructure, including reuse and disposal of batteries; and

(3) coordinated with ongoing secondary battery use programs at the National Laboratories and in industry.

(c) SOLICITATION.—Not later than 180 days after the date of the enactment of this Act, the Secretary shall solicit proposals to demonstrate the secondary use of batteries and associated equipment and supporting infrastructure in geographic locations throughout the United States. The Secretary may make additional solicitations for proposals if the Secretary determines that such solicitations are necessary to carry out this section.

(d) SELECTION OF PROPOSALS.—

(1) The Secretary shall, not later than 90 days after the closing date established by the Secretary for receipt of proposals under subsection (c), select up to 5 proposals which may receive financial assistance under this section once the Department is in receipt of appropriated funds.

(2) In selecting proposals, the Secretary shall consider diversity of battery type, geographic and climatic diversity, and life-cycle environmental effects of the approaches.

(3) No one project selected under this section shall receive more than 25 percent of the funds authorized for this Program.

(4) The Secretary shall consider the extent of involvement of State or local government and other persons in each demonstration project to optimize use of federal resources.

(5) The Secretary may consider such other criteria as the Secretary considers appropriate.

(e) CONDITIONS.—The Secretary shall require that—

(1) relevant information be provided to the Department, the users of the batteries, the proposers, and the battery manufacturers; and

(2) the proposer provide at least 50 percent of the costs associated with the proposal.

SEC. 915. ENERGY EFFICIENCY SCIENCE INITIATIVE.

(a) ESTABLISHMENT.—The Secretary shall establish an Energy Efficiency Science Initiative to be managed by the Assistant Secretary in the Department with responsibility for energy conservation under section 203(a)(9) of the Department of Energy Organization Act (42 U.S.C. 7133(a)(9)), in consultation with the Director of the Office of Science, for grants to be competitively awarded and subject to peer review for research relating to energy efficiency.

(b) REPORT.—The Secretary shall submit to the Congress, along with the President's annual budget request under section 1105(a) of title 31, United States Code, a report on the activities of the Energy Efficiency Science Initiative, including a description of the process used to award the funds and an explanation of how the research relates to energy efficiency.

Subtitle B—Distributed Energy

and Electric Energy Systems

SEC. 921. DISTRIBUTED ENERGY AND ELECTRIC ENERGY SYSTEMS.

(a) IN GENERAL.—

(1) The following sums are authorized to be appropriated to the Secretary for distributed energy and electric energy systems activities, including activities authorized under this subtitle:

(A) for fiscal year 2004, $190,000,000;

(B) for fiscal year 2005, $200,000,000;

(C) for fiscal year 2006, $220,000,000;

(D) for fiscal year 2007, $240,000,000; and

(E) for fiscal year 2008, $260,000,000.

(2) For the Initiative in subsection 927(e), there are authorized to be appropriated—

(A) for fiscal year 2004, $15,000,000;

(B) for fiscal year 2005, $20,000,000;

(C) for fiscal year 2006, $30,000,000;

(D) for fiscal year 2007, $35,000,000; and

(E) for fiscal year 2008, $40,000,000.

(b) MICRO-COGENERATION ENERGY TECHNOLOGY.— From amounts authorized under subsection (a), $20,000,000 for each of fiscal years 2004 and 2005 shall be available for activities under section 924.

SEC. 922. HYBRID DISTRIBUTED POWER SYSTEMS.

Not later than 1 year after the date of enactment of this Act, the Secretary shall develop and transmit to the Congress a strategy for a comprehensive research, development, demonstration, and commercial application program to develop hybrid distributed power systems that combine—

(1) one or more renewable electric power generation technologies of 10 megawatts or less located near the site of electric energy use; and

(2) nonintermittent electric power generation technologies suitable for use in a distributed power system.

SEC. 923. HIGH POWER DENSITY INDUSTRY PROGRAM.

The Secretary shall establish a comprehensive research, development, demonstration, and commercial application program to improve energy efficiency of high power density facilities, including data centers, server farms, and telecommunications facilities. Such program shall consider technologies that provide significant improvement in thermal controls, metering, load management, peak load reduction, or the efficient cooling of electronics.

SEC. 924. MICRO-COGENERATION ENERGY TECHNOLOGY.

The Secretary shall make competitive, merit-based grants to consortia for the development of micro-cogeneration energy technology. The consortia shall explore the use of small-scale combined heat and power in residential heating appliances, the use of excess power to operate other appliances within the residence and supply of excess generated power to the power grid.

SEC. 925. DISTRIBUTED ENERGY TECHNOLOGY DEMONSTRATION PROGRAM.

The Secretary, within the sums authorized under section 921(a)(1), may provide financial assistance to coordinating consortia of interdisciplinary participants for demonstrations designed to accelerate the utilization of distributed energy technologies, such as fuel cells, microturbines, reciprocating engines, thermally activated technologies, and combined heat and power systems, in highly energy intensive commercial applications.

SEC. 926. OFFICE OF ELECTRIC TRANSMISSION AND DISTRIBUTION.

(a) CREATION OF AN OFFICE OF ELECTRIC TRANSMISSION AND DISTRIBUTION.—Title II of the Department of Energy Organization Act is amended by inserting the following after section 217 (42 U.S.C. 7144d):

"OFFICE OF ELECTRIC TRANSMISSION AND DISTRIBUTION.

"SEC. 218. (a) There is established within the Department an Office of Electric Transmission and Distribution. This Office shall be headed by a Director, who shall be appointed by the Secretary. The Director shall be compensated at the annual rate prescribed for level IV of the Executive Schedule under section 5315 of title 5, United States Code.

"(b) The Director shall—

"(1) coordinate and develop a comprehensive, multi-year strategy to improve the Nation's electricity transmission and distribution;

"(2) ensure that the recommendations of the Secretary's National Transmission

Grid Study are implemented;

"(3) carry out the research, development, and demonstration functions;

"(4) grant authorizations for electricity import and export; and

"(5) perform other electricity transmission and distribution-related functions assigned by the Secretary.".

(b) CONFORMING AMENDMENTS.—

(1) The table of contents of the Department of Energy Act is amended by inserting after the item relating to section 217 the following new item:

"218. Office of Electric Transmission and Distribution.".

(2) Section 5315 of title 5, United States Code, is amended by inserting "Director, Office of Electric Transmission and Distribution, Department of Energy." after "Inspector General, Department of Energy.".

SECTION 927. ELECTRIC TRANSMISSION AND DISTRIBUTION PROGRAMS.

(a) DEMONSTRATION PROGRAM.—The Secretary, acting through the Director of the Office of Electric Transmission and Distribution, shall establish a comprehensive research, development, and demonstration program to ensure the reliability, efficiency, and environmental integrity of electrical transmission and distribution systems. This program shall include—

(1) advanced energy and energy storage technologies, materials, and systems;

(2) advanced grid reliability and efficiency technology development;

(3) technologies contributing to significant load reductions;

(4) advanced metering, load management, and control technologies;

(5) technologies to enhance existing grid components;

(6) the development and use of high-temperature superconductors to

(A) enhance the reliability, operational flexibility, or power-carrying capability of electric transmission or distribution systems including composite conductor materials; or

(B) increase the efficiency of electric energy generation, transmission, distribution, or storage systems;

(7) integration of power systems, including systems to deliver high-quality electric power, electric power reliability, and combined heat and power;

(8) supply of electricity to the power grid by small scale, distributed and residential-based power generators;

(9) the development and use of advanced grid design, operation and planning tools;

(10) any other infrastructure technologies, as appropriate; and

(11) technology transfer and education.

(b) PROGRAM PLAN.—Not later than 1 year after the date of the enactment of this legislation, the Secretary, in consultation with other appropriate Federal agencies, shall prepare and transmit to Congress a 5-year program plan to guide activities under this section. In preparing the program plan, the Secretary shall consult with utilities, energy services providers, manufacturers, institutions of higher education, other appropriate State and local agencies, environmental organizations, professional and technical societies, and any other persons the Secretary considers appropriate.

(c) IMPLEMENTATION.—The Secretary shall consider implementing this program using a consortium of industry, university and national laboratory participants.

(d) REPORT.—Not later than 2 years after the transmittal of the plan under subsection (b), the Secretary shall transmit a report to Congress describing the progress made under this section and identifying any additional resources needed to continue the development and commercial application of transmission and distribution infrastructure technologies.

(e) POWER DELIVERY RESEARCH INITIATIVE.—The Secretary shall establish a research, development and demonstration initiative specifically focused on power delivery utilizing components incorporating high temperature superconductivity.

(1) Goals of this Initiative shall be to—

(A) establish world-class facilities to develop high temperature superconductivity power applications in partnership with manufacturers and utilities;

(B) provide technical leadership for establishing reliability for high temperature superconductivity power applications including suitable modeling

and analysis;

(C) facilitate commercial transition toward direct current power transmission, storage, and use for high power systems utilizing high temperature superconductivity; and

(D) facilitate the integration of very low impedance high temperature superconducting wires and cables in existing electric networks to improve system performance, power flow control and reliability.

(2) The Initiative shall include—

(A) feasibility analysis, planning, research, and design to construct demonstrations of superconducting links in high power, direct current and controllable alternating current transmission systems;

(B) public-private partnerships to demonstrate deployment of high temperature superconducting cable into testbeds simulating a realistic transmission grid and under varying transmission conditions, including actual grid insertions; and

(C) testbeds developed in cooperation with national laboratories, industries, and universities to demonstrate these technologies, prepare the technologies for commercial introduction, and address cost or performance roadblocks to successful commercial use.

(g) TRANSMISSION AND DISTRIBUTION GRID PLANNING AND OPERATIONS INITIATIVE.—The Secretary shall establish a research, development and demonstration initiative specifically focused on tools needed to plan, operate and expand the transmission and distribution grids in the presence of competitive market mechanisms for energy, load demand, customer response and ancillary services. Goals of this Initiative shall be to:

(1) develop and utilize a geographically distributed Center, consisting of research universities and national laboratories, with expertise and facilities to develop the underlying theory and software for power system application, and to assure commercial development in partnership with software vendors and utilities;

(2) provide technical leadership in engineering and economic analysis for reliability and efficiency of power systems planning and operations in the presence

of competitive markets for electricity;

(3) model, simulate and experiment with new market mechanisms and operating practices to understand and optimize such new methods before actual use; and

(4) provide technical support and technology transfer to electric utilities and other participants in the domestic electric industry and marketplace.

Subtitle C—Renewable Energy

SEC. 931. RENEWABLE ENERGY.

(a) IN GENERAL.—The following sums are authorized to be appropriated to the Secretary for renewable energy research, development, demonstration, and commercial application activities, including activities authorized under this subtitle:

(1) for fiscal year 2004, $480,000,000;

(2) for fiscal year 2005, $550,000,000;

(3) for fiscal year 2006, $610,000,000;

(4) for fiscal year 2007, $659,000,000; and

(5) for fiscal year 2008, $710,000,000.

(b) BIOENERGY.—From the amounts authorized under subsection (a), the following sums are authorized to be appropriated to carry out section 932:

(1) for fiscal year 2004, $135,425,000;

(2) for fiscal year 2005, $155,600,000;

(3) for fiscal year 2006, $167,650,000;

(4) for fiscal year 2007, $180,000,000; and

(5) for fiscal year 2008, $192,000,000.

(c) BIODIESEL ENGINE TESTING.—From amounts authorized under subsection (a), $5,000,000 is authorized to be appropriated in each of fiscal years 2004 and 2008 to carry out section 933.

(d) CONCENTRATING SOLAR POWER.—From amounts authorized under subsection (a), the following sums are authorized to be appropriated to carry out section 934:

(1) for fiscal year 2004, $20,000,000;

(2) for fiscal year 2005, $40,000,000; and

(2) for each of fiscal years 2006, 2007 and 2008, $50,000,000.

(e) LIMITS ON USE OF FUNDS.—

(1) None of the funds authorized to be appropriated under this section may be used for Renewable Support and Implementation.

(2) Of the funds authorized under subsection (b), not less than $5,000,000 for each fiscal year shall be made available for grants to Historically Black Colleges and Universities, Tribal Colleges, and Hispanic-Serving Institutions.

(f) CONSULTATION.—In carrying out this section, the Secretary, in consultation with the Secretary of Agriculture, shall demonstrate the use of advanced wind power technology, including combined use with coal gasification; biomass; geothermal energy systems; and other renewable energy technologies to assist in delivering electricity to rural and remote locations.

SEC. 932. BIOENERGY PROGRAMS.

(a) IN GENERAL.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for bioenergy, including—

(1) biopower energy systems;

(2) biofuels;

(3) bioproducts;

(4) integrated biorefineries that may produce biopower, biofuels and bioproducts;

(5) cross-cutting research and development in feedstocks; and

(6) economic analysis.

(b) BIOFUELS AND BIOPRODUCTS.—The goals of the biofuels and bioproducts programs shall be to develop, in partnership with industry—

(1) advanced biochemical and thermo-chemical conversion technologies capable of making fuels from cellulosic feedstocks that are price-competitive with gasoline or diesel in either internal combustion engines or fuel cell-powered vehicles; and

(2) advanced biotechnology processes capable of making biofuels and bioproducts with emphasis on development of biorefinery technologies using enzyme-based processing systems.

(c) DEFINITION.—For purposes of (b), the term “cellulosic feedstock” means any portion

of a crop not normally used in food production or any non-food crop grown for the purpose of producing biomass feedstock.

SEC. 933. BIODIESEL ENGINE TESTING PROGRAM.

(a) IN GENERAL.—Not later that 180 days after enactment of this Act, the Secretary shall initiate a partnership with diesel engine, diesel fuel injection system, and diesel vehicle manufacturers and diesel and biodiesel fuel providers to include biodiesel testing in advanced diesel engine and fuel system technology.

(b) SCOPE.—The study shall provide for testing to determine the impact of biodiesel on current and future emission control technologies, with emphasis on—

(1) the impact of biodiesel on emissions warranty, in-use liability, and anti-tampering provisions;

(2) the impact of long-term use of biodiesel on engine operations;

(3) the options for optimizing these technologies for both emissions and performance when switching between biodiesel and diesel fuel; and

(4) the impact of using biodiesel in these fueling systems and engines when used as a blend with 2006 Environmental Protection Agency-mandated diesel fuel containing a maximum of 15-parts-per-million sulfur content.

(c) REPORT.—Not later than 2 years after the date of enactment, the Secretary shall provide an interim report to Congress on the findings of this study, including a comprehensive analysis of impacts from biodiesel on engine operation for both existing and expected future diesel technologies, and recommendations for ensuring optimal emissions reductions and engine performance with biodiesel.

(d) DEFINITION.—For purposes of this section, the term "biodiesel" means a diesel fuel substitute produced from non-petroleum renewable resources that meets the registration requirements for fuels and fuel additives established by the Environmental Protection Agency under section 211 of the Clean Air Act (42 U.S.C. 7545) and that meets the American Society for Testing and Materials D6751-02a "Standard Specification for Biodiesel Fuel (B100) Blend Stock for Distillate Fuels."

SEC. 934 CONCENTRATING SOLAR POWER RESEARCH PROGRAM.

(a) IN GENERAL.—The Secretary shall conduct a program of research and development to

evaluate the potential of concentrating solar power for hydrogen production, including co-generation approaches for both hydrogen and electricity. Such program shall take advantage of existing facilities to the extent possible and shall include—

(1) development of optimized technologies that are common to both electricity and hydrogen production;

(2) evaluation of thermo-chemical cycles for hydrogen production at the temperatures attainable with concentrating solar power;

(3) evaluation of materials issues for the thermo-chemical cycles in (2);

(4) system architectures and economics studies; and

(5) coordination with activities in the Advanced Reactor Hydrogen Co-generation Project on high temperature materials, thermo-chemical cycle and economic issues.

(b) ASSESSMENT.—In carrying out the program under this section, the Secretary is directed to assess conflicting guidance on the economic potential of concentrating solar power for electricity production received from the National Research Council report entitled "Renewable Power Pathways: A Review of the U.S. Department of Energy's Renewable Energy Programs" in 2000 and subsequent DOE-funded reviews of that report and provide an assessment of the potential impact of this technology before, or concurrent with, submission of the fiscal year 2006 budget.

(c) REPORT.—Not later than 5 years after the date of enactment of this section, the Secretary shall provide a report to Congress on the economic and technical potential for electricity or hydrogen production, with or without co-generation, with concentrating solar power, including the economic and technical feasibility of potential construction of a pilot demonstration facility suitable for commercial production of electricity and/or hydrogen from concentrating solar power.

SEC. 935. MISCELLANEOUS PROJECTS.

The Secretary shall conduct research, development, demonstration, and commercial application programs for—

(1) ocean energy, including wave energy;

(2) the combined use of renewable energy technologies with one another and with other energy technologies, including the combined use of wind power and coal

gasification technologies; and

(3) renewable energy technologies for cogeneration of hydrogen and electricity.

Subtitle D—Nuclear Energy

SEC. 941. NUCLEAR ENERGY.

(a) CORE PROGRAMS.—The following sums are authorized to be appropriated to the Secretary for nuclear energy research, development, demonstration, and commercial application activities, including activities authorized under this subtitle, other than those described in subsection (b):

(1) for fiscal year 2004, $273,000,000;

(2) for fiscal year 2005, $305,000,000;

(3) for fiscal year 2006, $330,000,000;

(4) for fiscal year 2007, $355,000,000; and

(5) for fiscal year 2008, $495,000,000.

(b) NUCLEAR INFRASTRUCTURE SUPPORT.—The following sums are authorized to be appropriated to the Secretary for activities under section 942(f):

(1) for fiscal year 2004, $125,000,000;

(2) for fiscal year 2005, $130,000,000;

(3) for fiscal year 2006, $135,000,000;

(4) for fiscal year 2007, $140,000,000; and

(5) for fiscal year 2008, $145,000,000.

(c) ALLOCATIONS.—From amounts authorized under subsection (a), the following sums are authorized:

(1) For activities under section 943—

(A) for fiscal year 2004, $140,000,000;

(B) for fiscal year 2005, $145,000,000;

(C) for fiscal year 2006, $150,000,000;

(D) for fiscal year 2007, $155,000,000; and

(E) for fiscal year 2008, $275,000,000.

(2) For activities under section 944—

(A) for fiscal year 2004, $33,000,000;

(B) for fiscal year 2005, $37,900,000;

(C) for fiscal year 2006, $43,600,000;

(D) for fiscal year 2007, $50,100,000; and

(E) for fiscal year 2008, $56,000,000.

(3) For activities under section 946, for each of fiscal years 2004 through 2008, $6,000,000.

(d) None of the funds authorized under this section may be used for decommissioning the Fast Flux Test Facility.

SEC. 942. NUCLEAR ENERGY RESEARCH PROGRAMS.

(a) NUCLEAR ENERGY RESEARCH INITIATIVE.—The Secretary shall carry out a Nuclear Energy Research Initiative for research and development related to nuclear energy.

(b) NUCLEAR ENERGY PLANT OPTIMIZATION PROGRAM.—The Secretary shall carry out a Nuclear Energy Plant Optimization Program to support research and development activities addressing reliability, availability, productivity, component aging, safety and security of existing nuclear power plants.

(c) NUCLEAR POWER 2010 PROGRAM.—The Secretary shall carry out a Nuclear Power 2010 Program, consistent with recommendations in the October 2001 report entitled "A Roadmap to Deploy New Nuclear Power Plants in the United States by 2010" issued by the Nuclear Energy Research Advisory Committee of the Department. The Program shall include—

(1) utilization of the expertise and capabilities of industry, universities, and National Laboratories in evaluation of advanced nuclear fuel cycles and fuels testing;

(2) consideration of a variety of reactor designs suitable for both developed and developing nations;

(3) participation of international collaborators in research, development, and design efforts as appropriate; and

(4) encouragement for university and industry participation.

(d) GENERATION IV NUCLEAR ENERGY SYSTEMS INITIATIVE.—The Secretary shall carry out a Generation IV Nuclear Energy Systems Initiative to develop an overall technology plan and to support research and development necessary to make an informed technical decision

about the most promising candidates for eventual commercial application. The Initiative shall examine advanced proliferation-resistant and passively safe reactor designs, including designs that—

(1) are economically competitive with other electric power generation plants;

(2) have higher efficiency, lower cost, and improved safety compared to reactors in operation on the date of enactment of this Act;

(3) use fuels that are proliferation resistant and have substantially reduced production of high-level waste per unit of output; and

(4) use improved instrumentation.

(e) REACTOR PRODUCTION OF HYDROGEN.—The Secretary shall carry out research to examine designs for high-temperature reactors capable of producing large-scale quantities of hydrogen using thermo-chemical processes.

(f) NUCLEAR INFRASTRUCTURE SUPPORT.—The Secretary shall develop and implement a strategy for the facilities of the Office of Nuclear Energy, Science, and Technology and shall transmit a report containing the strategy along with the President's budget request to the Congress for fiscal year 2006. Such strategy shall provide a cost-effective means for—

(1) maintaining existing facilities and infrastructure, as needed;

(2) closing unneeded facilities;

(3) making facility upgrades and modifications; and

(4) building new facilities.

SEC. 943. ADVANCED FUEL CYCLE INITIATIVE.

(a) IN GENERAL.—The Secretary, through the Director of the Office of Nuclear Energy, Science and Technology, shall conduct an advanced fuel recycling technology research and development program to evaluate proliferation-resistant fuel recycling and transmutation technologies which minimize environmental or public health and safety impacts as an alternative to aqueous reprocessing technologies deployed as of the date of enactment of this Act in support of evaluation of alternative national strategies for spent nuclear fuel and the Generation IV advanced reactor concepts, subject to annual review by the Secretary's Nuclear Energy Research Advisory Committee or other independent entity, as appropriate. Opportunities to enhance progress of this program through international cooperation should be sought.

(b) REPORTS.—The Secretary shall report on the activities of the advanced fuel recycling technology research and development program as part of the Department's annual budget submission.

SEC. 944. UNIVERSITY NUCLEAR SCIENCE AND ENGINEERING SUPPORT.

(a) ESTABLISHMENT.—The Secretary shall support a program to invest in human resources and infrastructure in the nuclear sciences and engineering and related fields (including health physics and nuclear and radiochemistry), consistent with departmental missions related to civilian nuclear research and development.

(b) DUTIES.—In carrying out the program under this section, the Secretary shall establish fellowship and faculty assistance programs, as well as provide support for fundamental research and encourage collaborative research among industry, national laboratories, and universities through the Nuclear Energy Research Initiative. The Secretary is encouraged to support activities addressing the entire fuel cycle through involvement of both the Offices of Nuclear Energy, Science and Technology and Civilian Radioactive Waste Management. The Secretary shall support communication and outreach related to nuclear science, engineering and nuclear waste management.

(c) MAINTAINING UNIVERSITY RESEARCH AND TRAINING REACTORS AND ASSOCIATED INFRASTRUCTURE.—Activities under this section may include—

(1) converting research reactors currently using high-enrichment fuels to low-enrichment fuels, upgrading operational instrumentation, and sharing of reactors among institutions of higher education;

(2) providing technical assistance, in collaboration with the United States nuclear industry, in relicensing and upgrading training reactors as part of a student training program; and

(3) providing funding for reactor improvements as part of a focused effort that emphasizes research, training, and education.

(d) UNIVERSITY–NATIONAL LABORATORY INTERACTIONS.—The Secretary shall develop sabbatical fellowship and visiting scientist programs to encourage sharing of personnel between national laboratories and universities.

(e) OPERATING AND MAINTENANCE COSTS.—Funding for a research project provided

under this section may be used to offset a portion of the operating and maintenance costs of a research reactor at an institution of higher education used in the research project.

SEC. 945. SECURITY OF NUCLEAR FACILITIES.

The Secretary, through the Director of the Office of Nuclear Energy, Science and Technology shall conduct a research and development program on cost-effective technologies for increasing the safety of nuclear facilities from natural phenomena and the security of nuclear facilities from deliberate attacks.

SEC. 946. ALTERNATIVES TO INDUSTRIAL RADIOACTIVE SOURCES.

(a) SURVEY.—Not later than August 1, 2004, the Secretary shall provide to the Congress results of a survey of industrial applications of large radioactive sources. The survey shall—

(1) consider well-logging sources as one class of industrial sources;

(2) include information on current domestic and international Department, Department of Defense, State Department and commercial programs to manage and dispose of radioactive sources; and

(3) discuss available disposal options for currently deployed or future sources and, if deficiencies are noted for either deployed or future sources, recommend legislative options that Congress may consider to remedy identified deficiencies.

(b) PLAN.—In conjunction with the survey in subsection (a), the Secretary shall establish a research and development program to develop alternatives to such sources that reduce safety, environmental, or proliferation risks to either workers using the sources or the public. Miniaturized particle accelerators for well-logging or other industrial applications and portable accelerators for production of short-lived radioactive materials at an industrial site shall be considered as part of the research and development efforts. Details of the program plan shall be provided to the Congress by August 1, 2004.

Subtitle E—Fossil Energy

SEC. 951. FOSSIL ENERGY.

(a) IN GENERAL.—The following sums are authorized to be appropriated to the Secretary for fossil energy research, development, demonstration, and commercial application activities, including activities authorized under this subtitle:

(1) for fiscal year 2004, $523,000,000;

(2) for fiscal year 2005, $542,000,000;

(3) for fiscal year 2006, $558,000,000;

(4) for fiscal year 2007, $585,000,000; and

(5) for fiscal year 2008, $600,000,000.

(b) ALLOCATIONS.—From amounts authorized under subsection (a), the following sums are authorized:

(1) For activities under section 952(b)(2), $28,000,000 for each of the fiscal years 2004 through 2008.

(2) For activities under section 953—

(A) for fiscal year 2004, $12,000,000;

(B) for fiscal year 2005, $15,000,000; and

(C) for each of fiscal years 2006 through 2008, $20,000,000.

(3) For activities under section 954, to remain available until expended,—

(A) for fiscal year 2004, $200,000,000;

(B) for fiscal year 2005, $210,000,000; and

(C) for fiscal year 2006, $220,500,000.

(4) For the Office of Arctic Energy under section 3197 of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (Public Law 106-398), $25,000,000 for each of fiscal years 2004 through 2008.

(c) EXTENDED AUTHORIZATION.—There are authorized to be appropriated to the Secretary for the Office of Arctic Energy under section 3197 of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (Public Law 106-398), $25,000,000 for each of fiscal years 2009 through 2012.

(d) LIMITS ON USE OF FUNDS.—

(1) None of the funds authorized under this section may be used for Fossil Energy Environmental Restoration or Import/Export Authorization.

(2) Of the funds authorized under subsection (b)(2), not less than 20 percent of the funds appropriated for each fiscal year shall be dedicated to research and development carried out at institutions of higher education.

SEC. 952. OIL AND GAS RESEARCH PROGRAMS.

(a) OIL AND GAS RESEARCH.—The Secretary shall conduct a program of research, development, demonstration, and commercial application on oil and gas, including—

(1) exploration and production;

(2) gas hydrates;

(3) reservoir life and extension;

(4) transportation and distribution infrastructure;

(5) ultraclean fuels;

(6) heavy oil and oil shale; and

(7) related environmental research.

(b) FUEL CELLS.—

(1) The Secretary shall conduct a program of research, development, demonstration, and commercial application on fuel cells for low-cost, high-efficiency, fuel-flexible, modular power systems.

(2) The demonstrations shall include fuel cell proton exchange membrane technology for commercial, residential, and transportation applications, and distributed generation systems, utilizing improved manufacturing production and processes.

(c) NATURAL GAS AND OIL DEPOSITS REPORT.—Not later than 2 years after the date of the enactment of this Act, and every 2 years thereafter, the Secretary of the Interior, in consultation with other appropriate Federal agencies, shall transmit a report to the Congress of the latest estimates of natural gas and oil reserves, reserves growth, and undiscovered resources in Federal and State waters off the coast of Louisiana and Texas.

(d) INTEGRATED CLEAN POWER AND ENERGY RESEARCH.—

(1) The Secretary shall establish a national center or consortium of excellence in clean energy and power generation, utilizing the resources of the existing Clean Power and Energy Research Consortium, to address the nation's critical dependence on energy and the need to reduce emissions.

(2) The center or consortium will conduct a program of research, development, demonstration and commercial application on integrating the following six focus areas:

(A) efficiency and reliability of gas turbines for power generation;

(B) reduction in emissions from power generation;

(C) promotion of energy conservation issues;

(D) effectively utilizing alternative fuels and renewable energy;

(E) development of advanced materials technology for oil and gas exploration and utilization in harsh environments; and

(F) education on energy and power generation issues.

SEC. 953. RESEARCH AND DEVELOPMENT FOR COAL MINING TECHNOLOGIES.

(a) ESTABLISHMENT.—The Secretary shall carry out a program of research and development on coal mining technologies. The Secretary shall cooperate with appropriate Federal agencies, coal producers, trade associations, equipment manufacturers, institutions of higher education with mining engineering departments, and other relevant entities.

(b) PROGRAM.—The research and development activities carried out under this section shall—

(1) be guided by the mining research and development priorities identified by the Mining Industry of the Future Program and in the recommendations from relevant reports of the National Academy of Sciences on mining technologies;

(2) include activities exploring minimization of contaminants in mined coal that contribute to environmental concerns including development and demonstration of electromagnetic wave imaging ahead of mining operations;

(3) develop and demonstrate coal bed electromagnetic wave imaging and radar techniques for horizontal drilling in order to increase methane recovery efficiency, prevent spoilage of domestic coal reserves and minimize water disposal associated with methane extraction; and

(4) expand mining research capabilities at institutions of higher education.

SEC. 954. COAL AND RELATED TECHNOLOGIES PROGRAM

(a) IN GENERAL.—In addition to the program authorized under Title II of this Act, the Secretary of Energy shall conduct a program of technology research, development and demonstration and commercial application for coal and power systems, including programs to facilitate production and generation of coal-based power through—

(1) innovations for existing plants;

(2) integrated gasification combined cycle;

(3) advanced combustion systems;

(4) turbines for synthesis gas derived from coal;

(5) carbon capture and sequestration research and development;

(6) coal-derived transportation fuels and chemicals;

(7) solid fuels and feedstocks; and

(8) advanced coal-related research.

(B) COST AND PERFORMANCE GOALS.—In carrying out programs authorized by this section, the Secretary shall identify cost and performance goals for coal-based technologies that would permit the continued cost-competitive use of coal for electricity generation, as chemical feedstocks, and as transportation fuel in 2007, 2015, and the years after 2020. In establishing such cost and performance goals, the Secretary shall—

(1) consider activities and studies undertaken to date by industry in cooperation with the Department of Energy in support of such assessment;

(2) consult with interested entities, including coal producers, industries using coal, organizations to promote coal and advanced coal technologies, environmental organizations and organizations representing workers;

(3) not later than 120 days after the date of enactment of this section, publish in the Federal Register proposed draft cost and performance goals for public comments; and

(4) not later than 180 days after the date of enactment of this section and every four years thereafter, submit to Congress a report describing final cost and performance goals for such technologies that includes a list of technical milestones as well as an explanation of how programs authorized in this section will not duplicate the activities authorized under the Clean Coal Power Initiative authorized under Title II of this Act.

Subtitle F—Science

SEC. 961. SCIENCE.

(a) IN GENERAL.—The following sums are authorized to be appropriated to the Secretary for research, development, demonstration, and commercial application activities of the Office of Science, including activities authorized under this subtitle, including the amounts authorized under the amendment made by section 967(c)(2)(D), and including basic energy sciences,

advanced scientific and computing research, biological and environmental research, fusion energy sciences, high energy physics, nuclear physics, and research analysis and infrastructure support:

(1) for fiscal year 2004, $3,785,000,000;

(2) for fiscal year 2005, $4,153,000,000;

(3) for fiscal year 2006, $4,586,000,000

(4) for fiscal year 2007, $5,000,000,000; and

(5) For fiscal year 2008, $5,400,000,000.

(b) ALLOCATIONS.—From amounts authorized under subsection (a), the following sums are authorized:

(1) For activities of the Fusion Energy Sciences Program, including activities under section 962—

(A) for fiscal year 2004, $335,000,000;

(B) for fiscal year 2005, $349,000,000;

(C) for fiscal year 2006, $362,000,000;

(D) for fiscal year 2007, $377,000,000; and

(E) for fiscal year 2008, $393,000,000.

(2) For the Spallation Neutron Source—

(A) for construction in fiscal year 2004, $124,600,000;

(B) for construction in fiscal year 2005, $79,800,000; and

(C) for completion of construction in fiscal year 2006, $41,100,000; and

(D) for other project costs (including research and development necessary to complete the project, preoperations costs, and capital equipment related to construction), $103,279,000 for the period encompassing fiscal years 2003 through 2006, to remain available until expended through September 30, 2006.

(3) For Catalysis Research activities under section 965—

(A) for fiscal year 2004, $33,000,000;

(B) for fiscal year 2005, $35,000,000;

(C) for fiscal year 2006, $36,500,000;

(D) for fiscal year 2007, $38,200,000; and

(E) for fiscal year 2008, $40,100,000.

(4) For Nanoscale Science and Engineering Research activities under section 966—

(A) for fiscal year 2004, $270,000,000;

(B) for fiscal year 2005, $290,000,000;

(C) for fiscal year 2006, $310,000,000;

(D) for fiscal year 2007, $330,000,000; and

(E) for fiscal year 2008, $375,000,000.

(5) For activities under subsection 966(c), from the amounts authorized under subparagraph (4)—

(A) for fiscal year 2004, $135,000,000;

(B) for fiscal year 2005, $150,000,000;

(C) for fiscal year 2006, $120,000,000;

(D) for fiscal year 2007, $100,000,000; and

(E) for fiscal year 2008, $125,000,000.

(6) For activities in the Genomes to Life Program under section 968—

(A) for fiscal year 2004, $100,000,000;

(B) for fiscal year 2005, $170,000,000;

(C) for fiscal year 2006, $325,000,000;

(D) for fiscal year 2007, $415,000,000; and

(E) for fiscal year 2008, $455,000,000.

(7) For construction and ancillary equipment of the Genomes to Life User Facilities under section 968(d), of funds authorized under (6)—

(A) for fiscal year 2004, $16,000,000;

(B) for fiscal year 2005, $70,000,000;

(C) for fiscal year 2006, $175,000,000;

(D) for fiscal year 2007, $215,000,000; and

(E) for fiscal year 2008, $205,000,000.

(8) For activities in the Water Supply Technologies Program under section 970, $30,000,000 for each of fiscal years 2004 through 2008.

(c) In addition to the funds authorized under subsection (b)(1), the following sums are authorized for construction costs associated with the ITER project under section 962—

(1) for fiscal year 2006, $55,000,000;

(2) for fiscal year 2007, $95,000,000; and

(3) for fiscal year 2008, $115,000,000.

SEC. 962. UNITED STATES PARTICIPATION IN ITER.

(a) PARTICIPATION.—

(1) The Secretary of Energy is authorized to undertake full scientific and technological cooperation in the International Thermonuclear Experimental Reactor project (referred to in this title as "ITER").

(2) In the event that ITER fails to go forward within a reasonable period of time, the Secretary shall send to Congress a plan, including costs and schedules, for implementing the domestic burning plasma experiment known as the Fusion Ignition Research Expriment. Such a plan shall be developed with full consultation with the Fusion Energy Sciences Advisory Committee and be reviewed by the National Research Council.

(3) It is the intent of Congress that such sums shall be largely for work performed in the United States and that such work contributes the maximum amount possible to the U.S. scientific and technological base.

(b) PLANNING.—

(1) Not later than 180 days of the date of enactment of this act, the Secretary shall present to Congress a plan, with proposed cost estimates, budgets and potential international partners, for the implementation of the goals of this section. The plan shall ensure that—

(A) existing fusion research facilities are more fully utilized;

(B) fusion science, technology, theory, advanced computation, modeling and simulation are strengthened;

(C) new magnetic and inertial fusion research facilities are selected based on scientific innovation, cost effectiveness, and their potential to advance the goal of practical fusion energy at the earliest date possible, and those that are selected

are funded at a cost-effective rate;

(D) communication of scientific results and methods between the fusion energy science community and the broader scientific and technology communities is improved;

(E) inertial confinement fusion facilities are utilized to the extent practicable for the purpose of inertial fusion energy research and development; and

(F) attractive alternative inertial and magnetic fusion energy approaches are more fully explored.

(2) Such plan shall also address the status of and, to the degree possible, costs and schedules for—

(A) in coordination with the program in section 969, the design and implementation of international or national facilities for the testing of fusion materials; and

(B) the design and implementation of international or national facilities for the testing and development of key fusion technologies.

SEC. 963. SPALLATION NEUTRON SOURCE.

(a) DEFINITION.—For the purposes of this section, the term "Spallation Neutron Source" means Department Project 9909E 09334, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

(b) REPORT.—The Secretary shall report on the Spallation Neutron Source as part of the Department's annual budget submission, including a description of the achievement of milestones, a comparison of actual costs to estimated costs, and any changes in estimated project costs or schedule.

(c) AUTHORIZATION OF APPROPRIATIONS.—The total amount obligated by the Department, including prior year appropriations, for the Spallation Neutron Source may not exceed—

(1) $1,192,700,000 for costs of construction;

(2) $219,000,000 for other project costs; and

(3) $1,411,700,000 for total project cost.

SEC. 964. SUPPORT FOR SCIENCE AND ENERGY FACILITIES AND INFRASTRUCTURE.

(a) FACILITY AND INFRASTRUCTURE POLICY.—The Secretary shall develop and implement a strategy for facilities and infrastructure supported primarily from the Office of Science, the Office of Energy Efficiency and Renewable Energy, the Office of Fossil Energy, or the Office of Nuclear Energy, Science and Technology Programs at all national laboratories and single-purpose research facilities. Such strategy shall provide cost-effective means for—

(1) maintaining existing facilities and infrastructure, as needed;

(2) closing unneeded facilities;

(3) making facility modifications; and

(4) building new facilities.

(b) REPORT.—

(1) The Secretary shall prepare and transmit, along with the President's budget request to the Congress for fiscal year 2006, a report containing the strategy developed under subsection (a).

(2) For each national laboratory and single-purpose research facility, for the facilities primarily used for science and energy research, such report shall contain—

(A) the current priority list of proposed facilities and infrastructure projects, including cost and schedule requirements;

(B) a current ten-year plan that demonstrates the reconfiguration of its facilities and infrastructure to meet its missions and to address its long-term operational costs and return on investment;

(C) the total current budget for all facilities and infrastructure funding; and

(D) the current status of each facility and infrastructure project compared to the original baseline cost, schedule, and scope.

SEC. 965. CATALYSIS RESEARCH PROGRAM.

(A) ESTABLISHMENT.—The Secretary, through the Office of Science, shall support a program of research and development in catalysis science consistent with the Department's statutory authorities related to research and development. The program shall include efforts to—

(1) enable catalyst design using combinations of experimental and mechanistic

methodologies coupled with computational modeling of catalytic reactions at the molecular level;

(2) develop techniques for high throughput synthesis, assay, and characterization at nanometer and sub-nanometer scales in situ under actual operating conditions,

(3) synthesize catalysts with specific site architectures;

(4) conduct research on the use of precious metals for catalysis; and

(5) translate molecular understanding to the design of catalytic compounds.

(b) DUTIES OF THE OFFICE OF SCIENCE.—In carrying out this program, the Director of the Office of Science shall—

(1) support both individual investigators and multidisciplinary teams of investigators to pioneer new approaches in catalytic design;

(2) develop, plan, construct, acquire, share, or operate special equipment or facilities for the use of investigators in collaboration with national user facilities such as nanoscience and engineering centers;

(3) support technology transfer activities to benefit industry and other users of catalysis science and engineering; and

(4) coordinate research and development activities with industry and other federal agencies.

(c) TRIENNIAL ASSESSMENT.—The National Academy of Sciences shall review the catalysis program every three years to report on gains made in the fundamental science of catalysis and its progress towards developing new fuels for energy production and material fabrication processes.

SEC. 966. NANOSCALE SCIENCE AND ENGINEERING RESEARCH.

(a) ESTABLISHMENT.—The Secretary, acting through the Office of Science, shall support a program of research, development, demonstration, and commercial application in nanoscience and nanoengineering. The program shall include efforts to further the understanding of the chemistry, physics, materials science, and engineering of phenomena on the scale of nanometers and to apply this knowledge to the Department's mission areas.

(b) DUTIES OF THE OFFICE OF SCIENCE.—In carrying out the program under this section, the Office of Science shall—

(1) support both individual investigators and teams of investigators, including multidisciplinary teams;

(2) carry out activities under subsection (c);

(3) support technology transfer activities to benefit industry and other users of nanoscience and nanoengineering; and

(4) coordinate research and development activities with other DOE programs, industry and other Federal agencies.

(c) NANOSCIENCE AND NANOENGINEERING RESEARCH CENTERS AND MAJOR INSTRUMENTATION.—

(1) The Secretary shall carry out projects to develop, plan, construct, acquire, operate, or support special equipment, instrumentation, or facilities for investigators conducting research and development in nanoscience and nanoengineering.

(2) Projects under paragraph (1) may include the measurement of properties at the scale of nanometers, manipulation at such scales, and the integration of technologies based on nanoscience or nanoengineering into bulk materials or other technologies.

(3) Facilities under paragraph (1) may include electron microcharacterization facilities, microlithography facilities, scanning probe facilities, and related instrumentation.

(4) The Secretary shall encourage collaborations among DOE programs, institutions of higher education, laboratories, and industry at facilities under this subsection.

SEC. 967. ADVANCED SCIENTIFIC COMPUTING FOR ENERGY MISSIONS.

(a) IN GENERAL.—The Secretary, acting through the Office of Science, shall support a program to advance the Nation's computing capability across a diverse set of grand challenge, computationally based, science problems related to departmental missions.

(b) DUTIES OF THE OFFICE OF SCIENCE.—In carrying out the program under this section, the Office of Science shall—

(1) advance basic science through computation by developing software to solve grand challenge science problems on new generations of computing platforms in collaboration with other DOE program offices;

(2) enhance the foundations for scientific computing by developing the basic mathematical and computing systems software needed to take full advantage of the computing capabilities of computers with peak speeds of 100 teraflops or more, some of which may be unique to the scientific problem of interest;

(3) enhance national collaboratory and networking capabilities by developing software to integrate geographically separated researchers into effective research teams and to facilitate access to and movement and analysis of large (petabyte) data sets;

(4) maintain a robust scientific computing hardware infrastructure to ensure that the computing resources needed to address departmental missions are available; and

(5) explore new computing approaches and technologies that promise to advance scientific computing including developments in quantum computing.

(c) HIGH-PERFORMANCE COMPUTING ACT OF 1991 AMENDMENTS.—The High-Performance Computing Act of 1991 is amended—

(1) in section 4 (15 U.S.C. 5503)—

(A) in paragraph (3) by striking "means" and inserting "and 'networking and information technology' mean", and by striking "(including vector supercomputers and large scale parallel systems)"; and

(B) in paragraph (4), by striking "packet switched".

(2) in section 203 (15 U.S.C. 5523)—

(A) in subsection (a), by striking all after "As part of the" and inserting— "Networking and Information Technology Research and Development Program, the Secretary of Energy shall conduct basic and applied research in networking and information technology, with emphasis on supporting fundamental research in the physical sciences and engineering, and energy applications; providing supercomputer access and advanced communication capabilities and facilities to scientific researchers; and developing tools for distributed scientific collaboration.";

(B) in subsection (b), by striking "Program" and inserting "Networking and Information Technology Research and Development Program"; and

(C) by amending subsection (e) to read as follows:

"(e) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary of Energy to carry out the Networking and Information Technology Research and Development Program such sums as may be necessary for fiscal years 2004 through 2008.".

(d) COORDINATION.—The Secretary shall ensure that the program under this section is integrated and consistent with—

(1) the Accelerated Strategic Computing Initiative of the National Nuclear Security Administration; and

(2) other national efforts related to advanced scientific computing for science and engineering.

SEC. 968. GENOMES TO LIFE PROGRAM.

(a) ESTABLISHMENT.—The Secretary shall carry out a program of research, development, demonstration, and commercial application, to be known as the Genomes to Life Program, in systems biology and proteomics consistent with the Department's statutory authorities.

(b) PLANNING.—

(1) The Secretary shall prepare a program plan describing how knowledge and capabilities would be developed by the program and applied to Department missions relating to energy security, environmental cleanup, and national security.

(2) The program plan will be developed in consultation with other relevant Department technology programs.

(3) The program plan shall focus science and technology on long-term goals, including—

(A) contributing to U.S. independence from foreign energy sources, including production of hydrogen;

(B) converting carbon dioxide to organic carbon;

(C) advancing environmental cleanup;

(D) providing the science and technology for new biotechnology industries; and

(E) improving national security and combating bioterrorism.

(4) The program plan shall establish specific short-term goals and update these goals with the Secretary's annual budget submission.

(c) PROGRAM EXECUTION.—In carrying out the program under this Act, the Secretary shall—

(1) support individual investigators and multidisciplinary teams of investigators;

(2) subject to subsection (d), develop, plan, construct, acquire, or operate special equipment or facilities for the use of investigators conducting research, development, demonstration, or commercial application in systems biology and proteomics;

(3) support technology transfer activities to benefit industry and other users of systems biology and proteomics; and

(4) coordinate activities by the Department with industry and other federal agencies.

(d) GENOMES TO LIFE USER FACILITIES AND ANCILLARY EQUIPMENT.—

(1) Within the funds authorized to be appropriated pursuant to this Act, the amounts specified under section 961(b)(7) shall, subject to appropriations, be available for projects to develop, plan, construct, acquire, or operate special equipment, instrumentation, or facilities for investigators conducting research, development, demonstration, and commercial application in systems biology and proteomics and associated biological disciplines.

(2) Projects under paragraph (1) may include—

(A) the identification and characterization of multiprotein complexes;

(B) characterization of gene regulatory networks;

(C) characterization of the functional repertoire of complex microbial communities in their natural environments at the molecular level; and

(D) development of computational methods and capabilities to advance understanding of complex biological systems and predict their behavior.

(3) Facilities under paragraph (1) may include facilities, equipment, or instrumentation for—

(A) the production and characterization of proteins;

(B) whole proteome analysis;

(C) characterization and imaging of molecular machines; and

(D) analysis and modeling of cellular systems.

(4) The Secretary shall encourage collaborations among universities, laboratories and industry at facilities under this subsection. All facilities under this subsection shall have a specific mission of technology transfer to other institutions.

SEC. 969. FISSION AND FUSION ENERGY MATERIALS RESEARCH PROGRAM.

In the President's fiscal year 2006 budget request, the Secretary shall establish a research and development program on material science issues presented by advanced fission reactors and the Department's fusion energy program. The program shall develop a catalog of material properties required for these applications, develop theoretical models for materials possessing the required properties, benchmark models against existing data, and develop a roadmap to guide further research and development in this area.

SEC. 970. ENERGY-WATER SUPPLY TECHNOLOGIES PROGRAM.

(a) ESTABLISHMENT.— There is established within the Office of Science, Office of Biological and Environmental Research, the "Energy-Water Supply Technologies Program," to study energy-related issues associated with water resources and municipal waterworks and to study water supply issues related to energy production.

(b) DEFINITIONS.—

(1) The term "Foundation" means the American Water Works Association Research Foundation.

(2) The term "Indian tribe" has the meaning given the term in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450b).

(3) The term "Program" means the Water Supply Technologies Program established by section 970(a).

(c) PROGRAM AREAS.—The program shall conduct research and development, including—

(1) arsenic removal under subsection (d);

(2) desalination research program under subsection (e);

(3) the water and energy sustainability program under subsection (f); and

(4) other energy-intensive water supply and treatment technologies and other technologies selected by the Secretary.

(d) ARSENIC REMOVAL PROGRAM.—

(1) As soon as practicable after the date of enactment of this Act, the Secretary shall enter into a contract with the Foundation to utilize the facilities, institutions and relationships established in the "Consolidated Appropriations Resolution, 2003" as described in Senate Report 107-220 that will carry out a research program to develop and demonstrate innovative arsenic removal technologies.

(2) In carrying out the arsenic removal program, the Foundation shall, to the maximum extent practicable, conduct research on means of—

(A) reducing energy costs incurred in using arsenic removal technologies;

(B) minimizing materials, operating, and maintenance costs incurred in using arsenic removal technologies; and

(C) minimizing any quantities of waste (especially hazardous waste) that result from use of arsenic removal technologies.

(3) The Foundation shall carry out peer-reviewed research and demonstration projects to develop and demonstrate water purification technologies.

(4) In carrying out the arsenic removal program—

(A) demonstration projects will be implemented with municipal water system partners to demonstrate the applicability of innovative arsenic removal technologies in areas with different water chemistries representative of areas across the United States with arsenic levels near or exceeding EPA guidelines; and

(B) not less than 40 percent of the funds of the Department used for demonstration projects under the arsenic removal program shall be expended on projects focused on needs of and in partnership with rural communities or Indian tribes.

(5) The Foundation shall develop evaluations of cost effectiveness of arsenic removal technologies used in the program and an education, training, and technology transfer component for the program.

(6) The Secretary shall consult with the Administrator of the Environmental Protection Agency to ensure that activities under the arsenic removal program are coordinated with appropriate programs of the Environmental Protection Agency and

other federal agencies, state programs and academia.

(7) Not later than 1 year after the date of commencement of the arsenic removal program, and annually thereafter, the Secretary shall submit to Congress a report on the results of the arsenic removal program.

(e) DESALINATION PROGRAM.—

(1) The Secretary, in cooperation with the Commissioner of Reclamation, shall carry out a desalination research program in accordance with the desalination technology progress plan developed in Title II of the Energy and Water Development Appropriations Act, 2002 (115 Stat. 498), and described in Senate Report 107-39 under the heading "WATER AND RELATED RESOURCES" in the "BUREAU OF RECLAMATION" section.

(2) The desalination program shall—

(A) draw on the national laboratory partnership established with the Bureau of Reclamation to develop the January 2003 national Desalination and Water Purification Technology Roadmap for next-generation desalination technology;

(B) focus on research relating to, and development and demonstration of, technologies that are appropriate for use in desalinating brackish groundwater, wastewater and other saline water supplies; disposal of residual brine or salt; and

(C) consider the use of renewable energy sources.

(3) Under the desalination program, funds made available may be used for construction projects, including completion of the National Desalination Research Center for brackish groundwater and ongoing facility operational costs.

(4) The Secretary and the Commissioner of Reclamation shall jointly establish a steering committee for the desalination program. The steering committee shall be jointly chaired by 1 representative from this Program and 1 representative from the Bureau of Reclamation.

(f) WATER AND ENERGY SUSTAINABILITY PROGRAM.—

(1) The Secretary shall carry out a research program to develop understanding and technologies to assist in ensuring that sufficient quantities of water are available to meet

present and future requirements.

(2) Under this program and in collaboration with other programs within the Department including those within the Offices of Fossil Energy and Energy Efficiency and Renewable Energy, the Secretary of the Interior, Army Corps of Engineers, Environmental Protection Agency, Department of Commerce, Department of Defense, state agencies, non-governmental agencies and academia, the Secretary shall assess the current state of knowledge and program activities concerning—

(A) future water resources needed to support energy production within the United States including but not limited to the water needs for hydropower and thermo-electric power generation;

(B) future energy resources needed to support development of water purification and treatment including desalination and long-distance water conveyance;

(C) reuse and treatment of water produced as a by-product of oil and gas extraction;

(D) use of impaired and non-traditional water supplies for energy production and other uses; and

(E) technologies to reduce water use in energy production.

(3) In addition to the assessments in (2), the Secretary shall—

(A) develop a research plan defining the scientific and technology development needs and activities required to support long-term water needs and planning for energy sustainability, use of impaired water for energy production and other uses, and reduction of water use in energy production;

(B) carry out the research plan required under (A) including development of numerical models, decision analysis tools, economic analysis tools, databases, planning methodologies and strategies;

(C) implement at least three planning demonstration projects using the models, tools and planning approaches developed under subparagraph (B) and assess the viability of these tools at the scale of river basins with at least one demonstration involving an international border; and

(D) transfer these tools to other federal agencies, state agencies, non-profit organizations, industry and academia for use in their energy and water sustainability efforts.

(4) Not later than 1 year after the date of enactment of this Act, the Secretary shall submit to Congress a report on the water and energy sustainability program that describes the research elements described under paragraph (2), and makes recommendations for a management structure that optimizes use of Federal resources and programs.

(g) COST SHARING.—

(1) Research projects under this section shall not require cost-sharing.

(2) Each demonstration project carried out under the Program shall be carried out on a cost-shared basis, as determined by the Secretary.

(3) With respect to a demonstration project, the Secretary may accept in-kind contributions, and waive the cost-sharing requirement in appropriate circumstances.

Subtitle G—Energy and Environment

SEC. 971. UNITED STATES-MEXICO ENERGY TECHNOLOGY COOPERATION.

(a) PROGRAM.—The Secretary shall establish a research, development, demonstration, and commercial application program to be carried out in collaboration with entities in Mexico and the United States to promote energy efficient, environmentally sound economic development along the United States-Mexico border which minimizes public health risks from industrial activities in the border region.

(b) PROGRAM MANAGEMENT.—The program under subsection (a) shall be managed by the Department of Energy Carlsbad Environmental Management Field Office.

(c) TECHNOLOGY TRANSFER.—In carrying out projects and activities under this section, the Secretary shall assess the applicability of technology developed under the Environmental Management Science Program of the Department.

(d) INTELLECTUAL PROPERTY.—In carrying out this section, the Secretary shall comply with the requirements of any agreement entered into between the United States and Mexico regarding intellectual property protection.

(e) AUTHORIZATION OF APPROPRIATIONS.—The following sums are authorized to be appropriated to the Secretary to carry out activities under this section:

(1) For each of fiscal years 2004 and 2005, $5,000,000; and

(2) For each of fiscal years 2006, 2007, and 2008, $6,000,000.

SEC. 972. COAL TECHNOLOGY LOAN.

There are authorized to be appropriated to the Secretary $125,000,000 to provide a loan to the owner of the experimental plant constructed under United States Department of Energy cooperative agreement number DE09FC22 0991PC99544 on such terms and conditions as the Secretary determines, including interest rates and upfront payments.

Subtitle H—Management

SEC. 981. AVAILABILITY OF FUNDS.

Funds authorized to be appropriated to the Department under this title shall remain available until expended.

SEC. 982. COST SHARING.

(a) RESEARCH AND DEVELOPMENT.—Except as otherwise provided in this title, for research and development programs carried out under this title, the Secretary shall require a commitment from non-Federal sources of at least 20 percent of the cost of the project. Cost sharing is not required for research and development of a basic or fundamental nature.

(b) DEMONSTRATION AND COMMERCIAL APPLICATION.—Except as otherwise provided in this subtitle, the Secretary shall require at least 50 percent of the costs directly and specifically related to any demonstration or commercial application project under this subtitle to be provided from non-Federal sources. The Secretary may reduce the non-Federal requirement under this subsection if the Secretary determines that the reduction is necessary and appropriate considering the technological risks involved in the project and is necessary to meet the objectives of this title.

(c) CALCULATION OF AMOUNT.—In calculating the amount of the non-Federal commitment under subsection (a) or (b), the Secretary may include personnel, services, equipment, and other resources.

SEC. 983. MERIT REVIEW OF PROPOSALS.

Awards of funds authorized under this title shall be made only after an impartial review of the scientific and technical merit of the proposals for such awards has been carried out by or for the Department.

SEC. 984. EXTERNAL TECHNICAL REVIEW OF DEPARTMENTAL PROGRAMS.

(a) NATIONAL ENERGY RESEARCH AND DEVELOPMENT ADVISORY BOARDS.—

(1) The Secretary shall establish one or more advisory boards to review Department research, development, demonstration, and commercial application programs in energy efficiency, renewable energy, nuclear energy, and fossil energy.

(2) The Secretary may designate an existing advisory board within the Department to fulfill the responsibilities of an advisory board under this subsection, and may enter into appropriate arrangements with the National Academy of Sciences to establish such an advisory board.

(b) UTILIZATION OF EXISTING COMMITTEES.—The Secretary shall continue to use the scientific program advisory committees chartered under the Federal Advisory Committee Act by the Office of Science to oversee research and development programs under that Office.

(c) MEMBERSHIP.—Each advisory board under this section shall consist of persons with appropriate expertise representing a diverse range of interests.

(d) MEETINGS AND PURPOSES.—Each advisory board under this section shall meet at least semi-annually to review and advise on the progress made by the respective research, development, demonstration, and commercial application program or programs. The advisory board shall also review the measurable cost and performance-based goals for such programs as established under section 902, and the progress on meeting such goals.

(e) PERIODIC REVIEWS AND ASSESSMENTS.—The Secretary shall enter into appropriate arrangements with the National Academy of Sciences to conduct periodic reviews and assessments of the programs authorized by this title, the measurable cost and performance-based goals for such programs as established under section 902, if any, and the progress on meeting such goals. Such reviews and assessments shall be conducted every 5 years, or more often as the Secretary considers necessary, and the Secretary shall transmit to the Congress reports containing the results of all such reviews and assessments.

SEC. 985. IMPROVED COORDINATION OF TECHNOLOGY TRANSFER ACTIVITIES.

(a) TECHNOLOGY TRANSFER COORDINATOR.—The Secretary shall designate a Technology Transfer Coordinator to perform oversight of and policy development for technology transfer activities at the Department. The Technology Transfer Coordinator shall

coordinate the activities of the Technology Transfer Working Group, shall oversee the expenditure of funds allocated to the Technology Transfer Working Group, and shall coordinate with each technology partnership ombudsman appointed under section 11 of the Technology Transfer Commercialization Act of 2000 (42 U.S.C. 7261c).

(b) TECHNOLOGY TRANSFER WORKING GROUP.—The Secretary shall establish a Technology Transfer Working Group, which shall consist of representatives of the National Laboratories and single-purpose research facilities, to—

(1) coordinate technology transfer activities occurring at National Laboratories and single-purpose research facilities;

(2) exchange information about technology transfer practices, including alternative approaches to resolution of disputes involving intellectual property rights and other technology transfer matters; and

(3) develop and disseminate to the public and prospective technology partners information about opportunities and procedures for technology transfer with the Department, including those related to alternative approaches to resolution of disputes involving intellectual property rights and other technology transfer matters.

(c) TECHNOLOGY TRANSFER RESPONSIBILITY.—Nothing in this section shall affect the technology transfer responsibilities of Federal employees under the Stevenson-Wydler Technology Innovation Act of 1980.

SEC. 986. TECHNOLOGY INFRASTRUCTURE PROGRAM.

(a) ESTABLISHMENT.—The Secretary shall establish a Technology Infrastructure Program in accordance with this section.

(b) PURPOSE.—The purpose of the Technology Infrastructure Program shall be to improve the ability of National Laboratories and single-purpose research facilities to support departmental missions by—

(1) stimulating the development of technology clusters that can support departmental missions at the National Laboratories or single-purpose research facilities;

(2) improving the ability of National Laboratories and single-purpose research facilities to leverage and benefit from commercial research, technology, products, processes, and services; and

(3) encouraging the exchange of scientific and technological expertise between National Laboratories or single-purpose research facilities and entities that can support departmental missions at the National Laboratories or single-purpose research facilities, such as institutions of higher education; technology-related business concerns; nonprofit institutions; and agencies of State, tribal, or local governments.

(c) PROJECTS.—The Secretary shall authorize the Director of each National Laboratory or single-purpose research facility to implement the Technology Infrastructure Program at such National Laboratory or facility through projects that meet the requirements of subsections (d) and (e).

(d) PROGRAM REQUIREMENTS.—Each project funded under this section shall meet the following requirements:

(1) Each project shall include at least one of each of the following entities: a business; an institution of higher education; a nonprofit institution; and an agency of a State, local, or tribal government.

(2) Not less than 50 percent of the costs of each project funded under this section shall be provided from non-Federal sources. The calculation of costs paid by the non-Federal sources to a project shall include cash, personnel, services, equipment, and other resources expended on the project after start of the project. Independent research and development expenses of Government contractors that qualify for reimbursement under section 3109205 0918(e) of the Federal Acquisition Regulations issued pursuant to section 25(c)(1) of the Office of Federal Procurement Policy Act (41 U.S.C. 421(c)(1)) may be credited towards costs paid by non-Federal sources to a project, if the expenses meet the other requirements of this section.

(3) All projects under this section shall be competitively selected using procedures determined by the Secretary.

(4) Any participant that receives funds under this section may use generally accepted accounting principles for maintaining accounts, books, and records relating to the project.

(5) No Federal funds shall be made available under this section for construction or any project for more than 5 years.

(e) SELECTION CRITERIA.—

(1) The Secretary shall allocate funds under this section only if the Director of the National Laboratory or single-purpose research facility managing the project determines that the project is likely to improve the ability of the National Laboratory or single-purpose research facility to achieve technical success in meeting departmental missions.

(2) The Secretary shall consider the following criteria in selecting a project to receive Federal funds—

(A) the potential of the project to promote the development of a commercially sustainable technology cluster following the period of Department investment, which will derive most of the demand for its products or services from the private sector, and which will support departmental missions at the participating National Laboratory or single-purpose research facility;

(B) the potential of the project to promote the use of commercial research, technology, products, processes, and services by the participating National Laboratory or single-purpose research facility to achieve its mission or the commercial development of technological innovations made at the participating National Laboratory or single-purpose research facility;

(C) the extent to which the project involves a wide variety and number of institutions of higher education, nonprofit institutions, and technology-related business concerns that can support the missions of the participating National Laboratory or single-purpose research facility and that will make substantive contributions to achieving the goals of the project;

(D) the extent to which the project focuses on promoting the development of technology-related business concerns that are small businesses or involves such small businesses substantively in the project; and

(E) such other criteria as the Secretary determines to be appropriate.

(f) ALLOCATION.—In allocating funds for projects approved under this section, the Secretary shall provide—

(1) the Federal share of the project costs; and

(2) additional funds to the National Laboratory or single-purpose research facility

managing the project to permit the National Laboratory or single-purpose research facility to carry out activities relating to the project, and to coordinate such activities with the project.

(g) REPORT TO CONGRESS.—Not later than July 1, 2006, the Secretary shall report to Congress on whether the Technology Infrastructure Program should be continued and, if so, how the program should be managed.

(h) DEFINITIONS.—In this section:

(1) The term "technology cluster" means a concentration of technology-related business concerns, institutions of higher education, or nonprofit institutions, that reinforce each other's performance in the areas of technology development through formal or informal relationships.

(2) The term "technology-related business concern" means a for-profit corporation, company, association, firm, partnership, or small business concern that conducts scientific or engineering research; develops new technologies; manufactures products based on new technologies; or performs technological services.

(i) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary for activities under this section $10,000,000 for each of fiscal years 2004, 2005, and 2006.

SEC. 987. SMALL BUSINESS ADVOCACY AND ASSISTANCE.

(a) SMALL BUSINESS ADVOCATE.—The Secretary shall require the Director of each National Laboratory, and may require the Director of a single-purpose research facility, to designate a small business advocate to—

(1) increase the participation of small business concerns, including socially and economically disadvantaged small business concerns, in procurement, collaborative research, technology licensing, and technology transfer activities conducted by the National Laboratory or single-purpose research facility;

(2) report to the Director of the National Laboratory or single-purpose research facility on the actual participation of small business concerns in procurement and collaborative research along with recommendations, if appropriate, on how to improve participation;

(3) make available to small businesses training, mentoring, and information on how to participate in procurement and collaborative research activities;

(4) increase the awareness inside the National Laboratory or single-purpose research facility of the capabilities and opportunities presented by small business concerns; and

(5) establish guidelines for the program under subsection (b) and report on the effectiveness of such program to the Director of the National Laboratory or single-purpose research facility.

(b) ESTABLISHMENT OF SMALL BUSINESS ASSISTANCE PROGRAM.—The Secretary shall require the Director of each National Laboratory, and may require the Director of a single-purpose research facility, to establish a program to provide small business concerns—

(1) assistance directed at making them more effective and efficient subcontractors or suppliers to the National Laboratory or single-purpose research facility; or

(2) general technical assistance, the cost of which shall not exceed $10,000 per instance of assistance, to improve the small business concern's products or services.

(c) USE OF FUNDS.—None of the funds expended under subsection (b) may be used for direct grants to the small business concerns.

(d) DEFINITIONS.—In this section:

(1) The term "small business concern" has the meaning given such term in section 3 of the Small Business Act (15 U.S.C. 632).

(2) The term "socially and economically disadvantaged small business concerns" has the meaning given such term in section 8(a)(4) of the Small Business Act (15 U.S.C. 637(a)(4)).

(e) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary for activities under this section $5,000,000 for each of fiscal years 2004 through 2008.

SEC. 988. MOBILITY OF SCIENTIFIC AND TECHNICAL PERSONNEL.

Not later than 2 years after the date of enactment of this section, the Secretary shall transmit a report to the Congress identifying any policies or procedures of a contractor operating a National Laboratory or single-purpose research facility that create disincentives to the temporary transfer of scientific and technical personnel among the contractor-operated National

Laboratories or contractor-operated single-purpose research facilities and provide suggestions for improving inter-laboratory exchange of scientific and technical personnel.

SEC. 989. NATIONAL ACADEMY OF SCIENCES REPORT.

Not later than 90 days after the date of enactment of this Act, the Secretary shall enter into an arrangement with the National Academy of Sciences for the Academy to—

(1) conduct a study on—

(A) the obstacles to accelerating the research, development, demonstration, and commercial application cycle for energy technology; and

(B) the adequacy of Department policies and procedures for, and oversight of, technology transfer-related disputes between contractors of the Department and the private sector; and

(2) report to the Congress on recommendations developed as a result of the study.

SEC. 990. OUTREACH.

The Secretary shall ensure that each program authorized by this title includes an outreach component to provide information, as appropriate, to manufacturers, consumers, engineers, architects, builders, energy service companies, institutions of higher education, facility planners and managers, State and local governments, and other entities.

SEC. 991. COMPETITIVE AWARD OF MANAGEMENT CONTRACTS.

None of the funds authorized to be appropriated to the Secretary by this title may be used to award a management and operating contract for a nonmilitary energy laboratory of the Department unless such contract is competitively awarded or the Secretary grants, on a case-by-case basis, a waiver to allow for such a deviation. The Secretary may not delegate the authority to grant such a waiver and shall submit to the Congress a report notifying the Congress of the waiver and setting forth the reasons for the waiver at least 60 days prior to the date of the award of such a contract.

SEC. 992. REPROGRAMMING.

(a) DISTRIBUTION REPORT.—Not later than 60 days after the date of the enactment of an Act appropriating amounts authorized under this title, the Secretary shall transmit to the appropriate authorizing committees of the Congress a report explaining how such amounts will be distributed among the authorizations contained in this title.

(b) PROHIBITION.—

(1) No amount identified under subsection (a) shall be reprogrammed if such reprogramming would result in an obligation which changes an individual distribution required to be reported under subsection (a) by more than 5 percent unless the Secretary has transmitted to the appropriate authorizing committees of the Congress a report described in subsection (c) and a period of 30 days has elapsed after such committees receive the report.

(2) In the computation of the 30-day period described in paragraph (1), there shall be excluded any day on which either House of Congress is not in session because of an adjournment of more than 3 days to a day certain.

(c) REPROGRAMMING REPORT.—A report referred to in subsection (b)(1) shall contain a full and complete statement of the action proposed to be taken and the facts and circumstances relied on in support of the proposed action.

SEC. 993. CONSTRUCTION WITH OTHER LAWS.

Except as otherwise provided in this title, the Secretary shall carry out the research, development, demonstration, and commercial application programs, projects, and activities authorized by this title in accordance with the applicable provisions of the Atomic Energy Act of 1954 (42 U.S.C. et seq.), the Federal Nonnuclear Research and Development Act of 1974 (42 U.S.C. 5901 et seq.), the Energy Policy Act of 1992 (42 U.S.C. 13201 et seq.), the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.), chapter 18 of title 35, United States Code (commonly referred to as the Bayh-Dole Act), and any other Act under which the Secretary is authorized to carry out such activities.

SEC. 994. IMPROVED COORDINATION AND MANAGEMENT OF CIVILIAN SCIENCE AND TECHNOLOGY PROGRAMS.

(a) ADDITIONAL ASSISTANT SECRETARY POSITION TO ENABLE IMPROVED MANAGEMENT OF NUCLEAR ENERGY ISSUES.—

(1) Section 203(a) of the Department of Energy Organization Act (42 U.S.C. 7133(a)) is amended by striking "There shall be in the Department six Assistant Secretaries" and inserting "Except as provided in section 209, there shall be in the Department seven Assistant Secretaries".

(2) It is the sense of the Congress that the leadership for departmental missions in

nuclear energy should be at the Assistant Secretary level.

(b) REDESIGNATION OF POSITION OF DIRECTOR OF THE OFFICE OF SCIENCE.—

(1) Section 209 of the Department of Energy Organization Act (41 U.S.C.7139) is amended—

(A) in subsection (a), by striking "a Director" and inserting "an Assistant Secretary of Science";

(B) in subsection (b), by striking "Director" and inserting "Assistant Secretary"; and

(C) by adding at the end the following:

"(c) The Assistant Secretary of Science shall be in addition to the Assistant Secretaries provided for under section 203 of this Act.".

(2) Notwithstanding section 3345(b)(1) of title 5, United States Code, the President may designate the Director of the Office of Science immediately prior to the effective date of this Act to act in the office of Assistant Secretary of Energy for Science until the office is filled as provided in section 209 of the Department of Energy Organization Act, as amended by paragraph (1). While so acting, such person shall receive compensation at the rate provided by this Act for the office of Assistant Secretary for Science.

(c) TECHNICAL AND CONFORMING AMENDMENTS.—

(1) Section 5315 of title 5, United States Code, is amended by—

(A) striking "Director, Office of Science, Department of Energy."; and

(B) striking "Assistant Secretaries of Energy (6)" and inserting "Assistant Secretaries of Energy (8)".

(2) The table of contents for the Department of Energy Organization Act (42 U.S.C. 7101 note) is amended—

(A) by striking "Section 209" and inserting "Sec. 209";

(B) by striking "213." and inserting "Sec. 213.";

(C) by striking "214." and inserting "Sec. 214.";

(D) by striking "215." and inserting "Sec. 215."; and

(E) by striking "216." and inserting "Sec. 216.".

SEC. 995. EDUCATIONAL PROGRAMS IN SCIENCE AND MATHEMATICS

(a) Section 3165a of the Department of Energy Science Education Enhancement Act (42 U.S.C. 7381a) is amended by adding at the end:

"(14) Support competitive events for students, under supervision of teachers, designed to encourage student interest and knowledge in science and mathematics."

(b) Section 3169 of the Department of Energy Science Education Enhancement Act (42 U.S.C. 7381e), as redesignated by this Act, is amended by inserting before the period: "; and $40,000,000 for each of fiscal years 2004 through 2008."

SEC. 996. OTHER TRANSACTIONS AUTHORITY.

Section 646 of the Department of Energy Organization act (42 U.S.C. 7256) is amended by adding at the end the following:

"(g)(1) In addition to other authorities granted to the Secretary under law, the Secretary may enter into other transactions on such terms as the Secretary may deem appropriate in furtherance of research, development, or demonstration functions vested in the Secretary. Such other transactions shall not be subject to the provisions of section 9 of the Federal Nonnuclear Energy Research and Development Act of 1974 (42 U.S.C. 5908).

"(2)(A) The Secretary shall ensure that—

"(i) to the maximum extent the Secretary determines practicable, no transaction entered into under paragraph (1) provides for research, development, or demonstration that duplicates research, development, or demonstration being conducted under existing projects carried out by the Department; and

"(ii) To the extent the Secretary determines practicable, the funds provided by the Government under a transaction authorized by paragraph (1) do not exceed the total amount provided by other parties to the transaction.

"(iii) To the extent the Secretary determines practicable, competitive, merit-based selection procedures shall be used when entering into transactions under paragraph (1).

"(B) A transaction authorized by paragraph (1) may be used for a research, development, or demonstration project only if the Secretary determines the use of a standard contract, grant, or cooperative agreement for the project is not feasible or appropriate.

"(3)(A) The Secretary shall protect from disclosure, including disclosure under section

552 of title 5, United States Code, for up to 5 years after the date the information is received by the Secretary—

"(i) a proposal, proposal abstract, and supporting documents submitted to the Department in a competitive or noncompetitive process having the potential for resulting in an award to the party submitting the information entering into a transaction under paragraph (1); and

"(ii) a business plan and technical information relating to a transaction authorized by paragraph (1) submitted to the Department as confidential business information.

"(B) The Secretary may protect from disclosure, for up to 5 years after the information was developed, any information developed pursuant to a transaction under paragraph (1) which developed information is of a character that it would be protected from disclosure under section 552(b)(4) of title 5, United States Code, if obtained from a person other than a Federal agency.

"(4) Not later than 90 days after the date of enactment of this section, the Secretary shall prescribe guidelines for using other transactions authorized by the amendment under subsection (a). Such guidelines shall be published in the Federal Register for public comment under rulemaking procedures of the Department.

"(5) The authority of the Secretary under this subsection may be delegated only to an officer of the Department who is appointed by the President by and with the advice and consent of the Senate and may not be delegated to any other person.".

SEC. 997. REPORT ON RESEARCH AND DEVELOPMENT PROGRAM EVALUATION METHODOLOGIES.

Not later than 180 days after the date of enactment of this Act, the Secretary shall enter into appropriate arrangements with the National Academy of Sciences to investigate and report on the scientific and technical merits of any evaluation methodology currently in use or proposed for use in relation to the scientific and technical programs of the Department by the Secretary or other Federal official. Not later than 6 months after receiving the report of the National Academy, the Secretary shall submit such report to Congress, along with any other views or plans of the Secretary with respect to the future use of such evaluation methodology.